

THE GENUS ELATINE IN EASTERN NORTH AMERICA.

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It has become customary to treat all Elatine from the margins of ponds and streams in eastern America as *Elatine americana* (Pursh) Arn.,—to such an extent that local botanists rarely examine the details of the plants. During the past summer, however, while exploring the tidal reaches of the lower Kennebec system in Maine, Mr. Bayard Long and the writer were much interested in a peculiar prostrate and matted Elatine which was found in great abundance in the tidal mud of Cathance River at Bowdoinham. The plants of these tidal flats differed somewhat in appearance, the smaller plants having the leaves cuneate-obovate to oblong and sessile, the larger plants having the mostly larger leaves more broadly obovate and petioled. A detailed study of this material, as well as all the specimens in the Gray Herbarium, the herbarium of the New England Botanical Club, and of the Academy of Sciences of Philadelphia (including the herbarium of the Philadelphia Botanical Club) shows that we have in the Atlantic states and eastern British America three quite distinct species of the genus, distinguished not only in the form of the foliage but in the floral characters and in the shape, size and markings of the seed.

The commonest plant is the small species in sandy, gravelly or peaty pond-margins with rather small cuneate-obovate to oblong sessile leaves. In this plant the flowers are dimerous, having two sepals, two petals and two stamens. The seed is comparatively thick and more or less barrel-shaped, with rounded ends, 0.5–0.7 mm. long and 220–280 μ thick. The seed has distinct longitudinal ribs and between them 15–18 obtuse cross-ribs marking off somewhat rectangular reticulations. This plant, the commonest species in eastern America, was well described and illustrated by Nuttall as *Crypta minima*¹ from “gravelly banks of the Delaware overflowed by the tide.” The plant is well illustrated with two sepals, two petals and two stamens, and the type material, now preserved in the herbarium of the Academy at Philadelphia, has the very characteristic seed of the common plant of sandy and gravelly shores. This species, which Nuttall thought

¹Nuttall, Journ. Acad. Sci. Phil. i. 117, t. 6, fig. 1 (1817).

might be the same as Pursh's *Peplis americana* but which is apparently quite distinct from Pursh's plant, although commonly occurring in fresh sandy and gravelly shores, occasionally extends into wet clay and even into the borders of salt marshes, although it is apparently rare in these extreme habitats.

The plant which is more distinctive of brackish or tidal mud, the plant with petioled obovate leaves, has a trimerous flower, with three sepals and three petals, and is undoubtedly the plant intended by Pursh as his *Peplis americana*, which was described, "foliis crassis spathulato-obovatis", and which was "inundated during its flowering time, in slow-flowing places of rivers, in Pennsylvania."¹ The habitat, it is true, is so similar to that of Nuttall's later published *Crypta minima* that it was quite natural for Nuttall to assume that his plant and Pursh's were identical, but Nuttall's species had dimerous flowers, while Pursh's plant of inundated shores was put by him into the Linnean group *Hexandria*, where he certainly would not have placed a plant with dimerous flowers.

The plant with petioled obovate leaves, which occurs on the tidal flats of Cathance River in Maine and on the tidal flats of the Delaware, as well as at a few other stations along the Atlantic coast, has very definitely three sepals and three petals, although the writer has been unable to determine with complete satisfaction (owing to the maturity of specimens) whether the stamens are three or six. In view, however, of the occurrence of this plant with trimerous flowers and obovate leaves on the tidal flats of the Delaware River, there is little doubt that it is the plant intended by Pursh as *Peplis americana*. This plant, which is identified with Pursh's species and which was afterwards called *Elatine americana* by Arnott, differs from *Crypta minima* (Nuttall) Fischer & Meyer in having the seeds ordinarily curved and decidedly more slender, ranging from 140–190 μ in diameter and with the longitudinal ribs much more irregular and obscure and connected by 20–30 acute cross-ribs.

The third plant of the Atlantic slope is a well known species of Europe, *E. triandra* Schkuhr, which has the trimerous flowers and essentially the seed of true *E. americana* but which has thin linear, elongate-lanceolate or lance-spatulate, often toothed leaves, and which often grows to a height of 2 dm. with long internodes, in these

¹ Pursh, Fl. Am. Sept. i. 238 (1814).

characters being quite unlike either of the other eastern American plants. The only known station in the Atlantic states for *E. triandra* is at Skowhegan, Maine, where it was collected in October, 1914, by Miss Louise H. Coburn from the bottom of a small pond in the park. In response to a letter from the writer Miss Coburn collected additional material on October 28, 1916, and wrote in regard to the station: "The pond is a natural bog-hole, enlarged and shaped for the Park and has been planted with water-lilies, which came from the Mount Desert Nurseries, Bar Harbor, and a few from Farquhar & Co. of Boston and Dedham."

Whether or not *Elatine triandra* is indigenous in Maine waits to be determined. The species is certainly indigenous in Yellowstone Lake and at other very remote points in the Rocky Mountain region, although there is grave doubt as to the identity of the plant reported under this name from Illinois. The species is common in Europe and it is not impossible that it was introduced with roots of nursery stock into the pond at Skowhegan. The question whether it is indigenous in New England can be determined only by finding it at other stations which have not been altered or planted to foreign plants.

By way of summary and in order to check the herbarium specimens seen, the following synopsis is appended. The specimens examined are in the Gray Herbarium and the herbaria of the New England Botanical Club and of the Academy of Sciences at Philadelphia.

A. Seeds slender-cylindric, usually curved, 140–190 μ thick, with 20–30 acute cross-ribs between the irregular or obscure longitudinal ribs: flowers 3-merous. B.

B. Leaves obovate to broadly spatulate, with rounded summits.

ELATINE AMERICANA (Pursh) Arnott, Edinb. Journ. Nat. & Geogr. Sci. i. 431 (1830). *Peplis americana* Pursh, Fl. Am. Sept. i. 238 (1814).—Forming prostrate mats becoming, when fully developed, 0.6–2 dm. broad; the subsending branchlets 1–5 cm. long: leaves 3–8 mm. long, 1–4.3 mm. broad (in dried specimens): sepals 3: petals 3: stamens (?) 3 or 6.—Chiefly, if not always, in wet clay, locally from Quebec to Delaware and eastern Pennsylvania. QUEBEC: on mud, Hull, October, 1890, *J. Macoun*: near Hull, October 4, 1904, *J. Macoun*, Herb. Geol. Surv. Can. no. 76,922. MAINE: tidal mudflats of Cathance River (best developed on open mud of small tributary brooks and rills), September 14 and 19, 1916, *Fernald & Long*, no. 14,107. CONNECTICUT: muddy border of Cartwheel Pond, Southington, August 22, 1900, *C. H. Bissell*; muddy shore of pond, Maltby Park, Orange, October 10, 1873, *F. W. Hall* (plants with

unusually expanded red petals); muddy shore of pond, out of water for some time, Huntington, August 16, 1899, *E. H. Eames*. NEW JERSEY: along Crosswicks Creek, Bordentown, Burlington Co., July 15, 1916, *Long*, nos. 6049, 6062; shores of Delaware River, Camden, September, 1877, *Martindale*; tidal mud of Delaware River, Camden, October 7, 1877, *C. F. Parker*; shores of Delaware near Cooper's Point, September 15, 1858, *W. W. Wister*. PENNSYLVANIA: banks of Delaware, Andelusia, August, 1866, *Martindale*; mud island in Delaware near Andelusia, August, 1898, *C. S. Williamson*; in tidal mud of Delaware, Richmond, Philadelphia, October 11, 1868, *E. D.*; tidal mud about the mouth of the Schuylkill and Tinicum, Delaware County, August 2, 1865, *C. E. Smith*. DELAWARE: Brandywine Creek by the Rolling Mill and Railroad Bridge, Wilmington, 1863, *Canby*; muddy banks of Brandywine Creek, Wilmington, July 16, 1865, *A. Commons*; tidal muddy banks of Brandywine between the high and low water marks, Wilmington, October 18, 1873, *A. Commons*; Noxontown Pond near Middletown, Newcastle County, August 16, 1908, *E. B. Bartram*; shore, two miles southeast of Middletown, August 16, 1908, *VanPelt & Long*.

B. Leaves linear to linear-spatulate, truncate or emarginate at tip.

E. TRIANDRA Schkuhr, Bot. Handb. i. 345, t. 109b, fig. 2 (1791). — Less matted; the ascending branches up to 2 dm. long: leaves 0.4–1.2 dm. long, 1–2 mm. broad.— Eurasia; lakes and ponds of Maine and the Rocky Mountain region, little known in America. The only eastern material seen is from MAINE: bottom of little pond in the Park, Skowhegan, October 15, 1914, October 28, 1916, *Louise H. Coburn*.

A. Seeds thick-cylindric or barrel-shaped, mostly straight, 220–280 μ thick, with distinct longitudinal ribs and 15–18 obtuse cross-ribs: flowers 2-merous.

E. MINIMA (Nutt.) Fisch. & Meyer, Linnaea, x. 73 (1836). *Crypta minima* Nutt. Journ. Acad. Phila. i. 117, t. 6, fig. 1 (1817). *E. Clintoniana* Peck, Rep. Reg. Univ. N. Y. xxii. 52 (1869).— Creeping, forming small mats rarely 1 dm. broad; the erect or strongly ascending branchlets 0.2–5 cm. high: leaves cuneate-obovate to oblong, sessile or obscurely petioled, rounded at summit, 0.7–5 mm. long, 0.3–3 mm. broad: sepals 2: petals 2: stamens 2.— On sandy, peaty or more rarely muddy shores and in shallow waters, Newfoundland to Virginia and Minnesota. NEWFOUNDLAND: shallow water, sandy margin of pond, Whitbourne, August 8, 1911, *Fernald & Wiegand*, no. 5853; clay bottoms, small ponds among the hills back of Birchy Cove (Curling), August 11, 1910, *Fernald & Wiegand*, no. 3710. MAINE: submersed at sandy margin of Pennamaquan River, Pembroke, August 18, 1909, *Fernald*, no. 1875; border of Mill Pond, Somesville, July 28, 1892, *E. L. Rand*, September 20, 1892, *Fernald*;

emersed and submersed, gravel at margin of Chickawaukie Pond, Rockland, August 22, 1909, *Fernald*, nos. 1873, 1874; in mountain pond, Mexico, September, 1894, *Kate Furbish*; abundant on muddy shore of Messalonskee River, Waterville, September 2, 1898, *Fernald*, no. 2607; in 1 m. of water, Great Pond, Belgrade, August 31, 1898, *Fernald*, no. 2623; less common than *E. americana* on tidal mud-flats of Cathance River, Bowdoinham, September 14 and 19, 1916, *Fernald & Long*, no. 14,104; border of salt marsh, Back River Creek, Woolwich, September 15, 1916, *Fernald & Long*, no. 14,105; sandy bottom of Sand Pond, Baldwin, August 30, 1916, *Norton, Fernald & Long*, no. 14,107; abundant in shallow margin of Bauneg Beg Pond, North Berwick, September 25, 1897, *Parlin & Fernald*. NEW HAMPSHIRE: sandy shores of Gilmore Pond, Jaffrey, July 20, 1898, *Robinson*, no. 498; shore of Emerson Pond, Rindge, August 17, 1912, *F. F. Forbes*. MASSACHUSETTS: wet sand, border of Haggett's Pond, Andover, September 15, 1882, *E. & C. E. Faxon*, September 24, 1899, *Rich, Williams*; sandy beach of Wenham Lake, Wenham, September 11, 1913, *Fernald, Hunnewell & Long*, no. 9935; Flax Pond, Lynn, August, 1880, *H. A. Young*; Sluice Pond, Lynn, August 22, 1880, *E. & C. E. Faxon*; Spot Pond, Melrose, September 29, 1880, *E. & C. E. Faxon*; submerged margin of Spot Pond, Stoneham, September 29, 1880, *E. & C. E. Faxon*, August 19 and October 6, 1894, *Rich*; wet sandy or peaty margin of Winter Pond, Winchester, September 22, 1908, *Fernald*, October 5, 1913, *Fernald & Long*, no. 9936; sandy margin of Heard's Pond, Wayland, September 10, 1909, *Fernald*; Learned's Pond, South Framingham, August, 1874, *C. E. Faxon*; shallow water near sandy margin of Cooper's Pond, Carver, August 30, 1913, *Fernald, Hunnewell & Long*, no. 9931; in shallow waters of pond, Plymouth, August 26, 1913, *S. N. F. Sanford*; damp sandy beaches of Great South Pond and Boot Pond, Plymouth, September 6, 1913, *Fernald, Hunnewell & Long*, nos. 9932, 9933; sandy borders of small ponds, Bourne, September 15, 1901, *Kennedy, Williams & Fernald* in *Plantae Exsiccatae Grayanae*, no. 23; Nine Mile Pond, Centreville, Barnstable, September 4, 1898, *Williams, Greenman*, no. 425; shallow waters near margins of small sand-bottomed ponds west of White Pond, Chatham, September 9, 1913, *Fernald & Long*, no. 9934; Nonquitt, August 1890, *E. W. Hervey*; pond, Nantucket, August, 1897, *L. L. Dame*; Maxcy's Pond, Nantucket, August 12, 1905, *Churchill*; sandy beach of Wallum Pond, Douglas, October 29, 1911, *Fernald*; margin of Bass Pond, sand plains, Springfield, August 27, 1913, *Bissell & Weatherby*; edge of Goose Pond, Tyringham, July 27, 1911, *R. Hoffmann*. RHODE ISLAND: "In Republica Insulae Rhodiensis," *Thurber & Calder*; Apponaug Pond, August 26, 1880, *E. & C. E. Faxon*; Tiverton, August 18, 1877, *J. C. Phelps*; Sands Pond, Block Island, August 18, 1892, *Bailey & Collins*; peaty ponds and pools between Pilot Hill and Southeast Point, Block Island, August 20, 1913, *Fernald, Hunnewell & Long*, no. 9930. CONNECTI-

CUT: shallow water of Prospect Reservoir, Prospect, September 1, 1912, *A. E. Blewitt*, no. 1549; Middlebury, August 28, 1896, *W. M. Shepardson*; shallow water and shores of Lake Quinnipaug, North Guilford, August 19, 1906, *G. H. Bartlett*; New Haven, September 16, 1879, *J. A. Allen*; Lake Saltonstall, September 23, 1880, *E. & C. E. Faxon*. NEW YORK: rocky shore of Bowman's Pond, Sandlake, Rensselaer County, July and August, 1868 (?), *C. H. Peck* (duplicate type of *E. Clintoniana* Peck); lake, Averill Park, Rensselaer County, September, 1883, *J. H. Wibbe*; submerged in shallow water, sandy bottom of White Lake, Forestport, Oneida County, July 22, 1904, *Haberer*, no. 2741; Albany, *A. Gray*; shores of Lake Mahopac, Putnam County, August, 1898, *J. Carey*; Long Island, *J. Torrey*. NEW JERSEY: pond near Milton, Morris County, August 2, 1904, *C. S. Williamson*; north shore of Spring Lake, Monmouth County, September 15, 1907, *C. S. Williamson*; in water, shore of Maxon's Pond, Point Pleasant, Ocean County, July 7, 1910, *Van Pelt & Brown*, no. 271; Bay Head, Ocean County, August 8, 1908, *E. B. Bartram*; Toms River at Island Heights, August 19, 1892, *J. R. Churchill*; margin of Delaware above William Cooper's Ferry, *S. N. Conrad*; shores of Delaware, Camden, September, 1877 (mixed with *E. americana*) *Martindale*. PENNSYLVANIA: banks of the Delaware overflowed by the tide, West Kensington, July, 1817 (?) *Nuttall* (type of *Crypta minima*); tidal mud about the mouth of the Schuylkill and Tinicum, Delaware County, August 2, 1865 (material mixed with *E. americana*), *C. E. Smith*. MARYLAND: sandy shores of Wicomico River near Salisbury, September, 1863, October, 1864, *Canby*. VIRGINIA: Alexandria, *A. H. Curtiss*. MINNESOTA: Linn Lake, Chisago County, August, 1872, *B. C. Taylor*.

GRAY HERBARIUM.

A NEW AGROPYRON FROM CAPE BRETON.

F. TRACY HUBBARD.

AGROPYRON **acadiense**, sp. nov. Glaucissimum, stoloniferum; rhizomata squamigera pallide brunnea. Culmi solitarii vel pauci, glabri, 2–6.5 dm. alti, nodis (3) valde constrictis flexilibusque; innovationes duae vel plures, culmis molto breviores. Vaginae basilares plures, glabrae, nonnullae elaminatae; illae culmorum laeves glabraeque marginibus aliquando breve ciliatis exceptis, inferiores purpureosae internodia circum aequantes vel etiam ea (saltem apud innovationes) superantes, superiores internodiis breviores, ad oram laminae